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facts before reaching a judgment as to their meaning and classification, and an habitual willingness to take great trouble in getting at the truth.

The first essay is by Professor J. H. Badley on the Place of Science in the School Curriculum. He tests the value of science in education by "the kind of motive it appeals to and arouses, the kind of power it develops, and the kind of discipline it gives." He shows that, tested by these criteria, science has an important place in the schools.

The remaining essays in the book are as follows: The Scope of Nature Study, Edward Thomas; The Teaching of Nature Study, Clotilde Von Wyss; Biology in Schools, Oswald Latter; The Teaching of Hygiene, Alice Ravenhill; The Place of Hypotheses in Science Teaching, T. Percy Nunn; The Claims of "Research" Work and Examinations, Fred Hodson; School Mathematics in Relation to School Science, T. James Garstang; Coordination of Physics Teaching in School and College with Special Reference to Electricity and Magnetism, Alfred W. Porter; Geography, J. H. N. Stephenson; Science in the Teaching of History, F. M. Powicke; Economic Science in Secondary Schools, Augustus Kahn; Domestic Science, Arthur Smithells; The Teaching of Chemistry in Technical Schools, Henry Garrett; How the School may help Agriculture, E. W. Read; Engineering, An Associate of the Institution of Civil Engineers—Science Teaching and the Training of the Affections, Sidney Unwin; Science Teaching and a Child's Philosophy, Cora B. Sanders; The Present Condition of Physics Teaching in the United States, C. R. Mann; School Science in Germany, the Editor; Some Practical Notes on the Planning of Science Laboratories, T. H. Russell.

In the brief space of a review it is impossible to give any definite idea of the content and richness of these essays. They are all excellent and full of suggestion. Every one who is interested in the problems of science teaching on broad lines should read and study this book at first hand. It is an important contribution to one of the most press-

ing of our school problems of the present day.  
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*Design in Nature.* By J. BELL PETTIGREW, M.D., F.R.S., 3 vols. New York, Longmans, Green & Co. 1908.

Dr. J. Bell Pettigrew, professor of anatomy and medicine in the University of St. Andrews, was more especially known for his contributions to mammalian anatomy and discussions on the physiology and mechanics of flight. He was not a skilled zoologist, in the sense of being an expert student of any particular group of animals; but he had a keen interest in nature and a wide, if somewhat shallow, knowledge of a great variety of subjects. Being firmly convinced that the order and beauty of the visible world bore eloquent testimony to the existence of an invisible but ever-present "creator, designer and upholder," he conceived the idea of preparing a work which should make this evident to every reader. The "argument for design" presented nothing new, of course; but never before had it been supported by such a wealth of illustrative facts, gleaned from the storehouses of modern science. Just as Darwin profited by the mass of data accumulated by those who knew nothing of evolution, now Pettigrew was to utilize the contributions of an unbelieving age, in support of the ancient doctrine of special creation. The work was finished, and partly printed, at the time of the author's death in January, 1908. It consists of three great quarto volumes, aggregating 1,416 pages, with innumerable illustrations. The printing and binding are excellent, and at the beginning of each volume is a portrait of the author. As is remarked in the preface, "it was necessary to deal with physics, chemistry, botany, zoology, anatomy, physiology, psychology and paleontology more or less in detail," but most space is given to the author's favorite subjects, vertebrate anatomy and animal locomotion. Those who have no sympathy with the main purpose of the work will find it a sort of glorified scientific scrap-book, full of entertaining and instructive matter. It does not

contain a closely reasoned philosophical argument, but naïvely assumes that there can be only one logical explanation of the facts presented, and consequently the case becomes stronger in proportion to the data accumulated. This is of course the attitude of the modern evolutionist, only his explanation is not quite the same. The wonders of adaptation, the community of general structure in series of animals, the facts of paleontology, all are brought forward as evidence of intelligent design. If two pictures or statues show points of resemblance we do not say that they are derived one from the other, but we may suspect that they were created by the same hand. Just so Dr. Pettigrew, and having got thus far, the very difficulties in the way of the creation hypothesis appear to lend it support. For example, take any remarkable case of adaptation; the naturalist may show that a particular species is able to flourish at a particular time and place, because of a multitude of circumstances, *all* of which are more or less essential to its prosperity. It would not be sufficient merely to create the animal, it must be exactly so, at exactly such a place, with all the other characters in the play doing their proper parts. Quite impossible! you say. On the contrary, it is such a marvelous thing that it *proves* the action not merely of intelligence, but of the highest conceivable kind! The trouble is, that it not only requires the highest conceivable intelligence, but a still higher and wholly *inconceivable* sort. It transcends physics and metaphysics, and lands us in the field of metapsychics. In other words, the "explanation" is no explanation at all, and serves merely to shelve the question of origin and sequence. The author, at the end of each discussion, turns around to his audience and asks, like the conjurer, who can explain the trick except in his way; but also like the conjurer, he refrains from telling us precisely what that way is. There is no reason to suppose that this ardent supporter of "creation" had or pretended to have the least idea of the nature of the process.

Although our criticism is adverse, we must

confess to a certain sympathy with the author. Evolution is not a key to unlock every door of mystery. We who are concerned daily with the mechanics of life need to be reminded from time to time that there are more dimensions of reality than those in which we quarry. It is not for us to claim that we really understand, in any complete sense, how this world of ours came to be what it is. As scientific men, however, we are bound to reject mere dummy explanations of things, mere words which embody no rational thought; and by the same token, we must hold fast to those facts and theories which seem to be best verified by experience. The theory of organic evolution, full of difficulties as it is, has some substance, some genuine pragmatic ability; that of creation, as held by Dr. Pettigrew, is but a shadow of a shadow. To our posterity five hundred years hence it will doubtless seem that we were groping in the dark; but let it be at least said of us, that we groped to the best of our ability.

T. D. A. COCKERELL

*Bulletin of the American Museum of Natural History*, Vol. XXVI.

This volume of contributions from the scientific staff of the American Museum of Natural History appears less interesting than its predecessor, though it attains a generous size of 430 pages, and contains twenty-nine articles from the pens of seventeen contributors. The articles of discussional and narrative value are fewer in number, and the volume is more confined to systematic studies.

Perhaps, from the point of view of general utility and interest, Mr. A. Hermann's demonstration of "Modern Laboratory Methods in Vertebrate Paleontology" most quickly attracts attention. The article can not be impugned on the score of paucity of detail. It makes indeed an excellent manual of direction for all museums of vertebrate fossils, and commands deference from the place its author holds among preparators. It is also in a measure, and quite frankly, a history of progress.

The papers on fossil vertebrates open with an article on the genus *Ancodon* by Dr. Mat-